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IS 2083 (1991): Flashlights [ETD 10: Primary Cells and Batteries]

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क्षणदीप — विशिष्टि

(दूसरा पुनरीक्षण)

Indian Standard

FLASHLIGHTS — SPECIFICATION

(Second Revision)

UDC 628·944·835

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BUREAU OF INDIAN STANDARDS
MANAK BHAVAN, 9 BAHADUR SHAH ZAFAR MARG
NEW DELHI 110002

December 1991

Price Group 3

Primary Cells and Batteries Sectional Committee, ET 10

FOREWORD

This Indian Standard (Second Revision) was adopted by the Bureau of Indian Standards, after the draft finalized by the Primary Cells and Batteries Sectional Committee had been approved by the Electrotechnical Division Council.

This standard was first published in 1962 and was revised in 1978 to upgrade the performance of flashlights, by including the requirements keeping in view the variety of designs, dimensions and finish of flashlights. The test for contact resistance of the switch was also added and the requirement of testing lumen output was kept pending for receipt of information.

As the ultimate performance of flashlight depends largely on the reflector and bulb, for the purposes of this standard the flashlight is taken to be complete with its reflector and bulb but without the battery (or batteries).

In this revision, the total circuit resistance excluding cells and lamps with switch in 'ON' position has been specified in addition to the resistance between the earth and the lamp holder and the contact resistance of the switch.

It is proposed to include the requirements of portable flashlights to be operated with rechargeable batteries in Annex A for the purpose of guidance only.

This being considered on the demand by the Director, Stores Purchase Department, Government of Karnataka, Bangalore, being more economical.

The outlines of these flashlights are being given in Annex A.

Specific views with data are invited from the members.

Modified and more appropriate methods of testing electroplated finish and tests for anodised finish based on experience are proposed to be substituted.

For the purpose of deciding whether a particular requirement of this standard is complied with, the final value, observed or calculated, expressing the result of a test, shall be rounded off in accordance with IS 2 : 1960 'Rules for rounding off numerical values (*revised*)'. The number of significant places retained in the rounded off value should be the same as that of the specified value in this standard.

AMENDMENT NO. 1 FEBRUARY 1996
TO
IS 2083 : 1991 FLASHLIGHTS — SPECIFICATION

(Second Revision)

(*Page* 1, *clause* 4.1.3) — Delete the first two lines.

(*Page* 2, *clause* 8.4.1) — Substitute the following for the existing clause:

'8.4.1 The plating shall be a minimum of 3 microns of bright nickel followed by a minimum of 0.15 micron of regular chromium.'

[*Page* 2, *clause* 8.4.1.2(b)] — Substitute the following for the existing clause:

'b) Plating on copper and copper alloy should withstand 16 hours of plain salt spray test as prescribed in IS 1068 : 1985.'

(*Page* 4, *Annex* B) — Delete the following entries:

'4827 : 1983	Electroplating coatings of nickel and chromium on copper and copper alloys (*first revision*)
4828 : 1983	Electroplated coatings of copper, nickel and chromium on zinc and zinc alloys (*first revision*)'

(ETD 10)

Reprography Unit, BIS, New Delhi, India

AMENDMENT NO. 2 APRIL 2005
TO
IS 2083 : 1991 FLASHLIGHTS — SPECIFICATION

(Second Revision)

(*Cover page* , *Foreword, para* 4, *line* 2) — Substitute 'been specified in addition to the contact resistance' *for* 'been specified in addition to the resistance'.

(*Page* 1, *clause* **4.1.3**) — Insert the following new clause:

'**4.1.4** The lamps shall conform to IS 2261.'

(*Page* 1, *clause* **4.2.6**) — Delete.

(*Page* 1, *clause* **6**, *last line*) — Substitute 'IS 8144 : 1997' *for* 'IS 203 : 1984'.

[*Page* 2, *clause* **8.1**(g)] — Add the following:

'h) Test for contact resistance switch and **8.2**(e)'

(*Page* 2, *clause* **8.1.1**, *Note* 2, *line* 2) — Substitute 'dry cold test' *for* 'cold test'.

[*Page* 2, *clause* **8.4.1.1**(a) *and* (b)] — Substitute 'IS 3203 : 1982' *for* 'IS 3203 : 1983'.

(*Page* 3, *clause* **8.8**) — Substitute 'IS 2992 : 1987' *for* 'IS 2992 : 1980'.

(*Page* 4, *Annex B*, IS 1065 : 1971 and IS 1868 : 1982) — Delete both the references.

(ET 10)

Reprography Unit, BIS, New Delhi, India

Indian Standard

FLASHLIGHTS — SPECIFICATION

(Second Revision)

1 SCOPE

1.1 This standard lays down the requirements and tests for dry battery operated portable flashlights.

1.1.1 This standard is applicable to pre-focused as well as focusing type of flashlights.

2 REFERENCES

The Indian Standards listed in Annex B are necessary adjuncts to this standard.

3 TERMINOLOGY

3.0 For the purpose of this standard, the following definitions shall apply.

3.1 Type Tests

Tests carried out to prove conformity with the requirements of the specification. These tests are intended to assess the general quality and design of a given type of flashlight.

3.2 Acceptance Tests

Tests carried out on samples drawn from a lot or batch for the purposes of acceptance of the lot or batch.

3.3 Routine Tests

Tests carried out on each flashlight to check requirements which are likely to vary during production.

4 MATERIAL, CONSTRUCTION AND WORKMANSHIP

4.1 Materials

4.1.1 The body of the flashlight shall be made of aluminium, brass, plastic or any other suitable material (*see* **5**, **8.4** and **8.6.2**).

4.1.2 The front portecting sheet shall be made of glass or any other suitable material of adequate transparency.

4.1.3 The resistance between the earth and lamp holder shall be 8 milliohms maximum. However, the total circuit resistance excluding cells and lamps with switch in 'ON' position shall not exceed 500 milliohms.

4.2 Construction

4.2.1 The reflecting surface of the reflector shall be free (when seen with the naked eye) from defects, such as scratches and deformations.

4.2.2 Contact parts of the switch shall be so constructed as to offer ease of operation and shall be capable of maintaining good electrical contact while in the 'ON' position. The design of the switch shall be such as to prevent accidental short circuits.

4.2.3 Joints, if any, in the body of the flashlight shall be firm.

4.2.4 The fit between threaded parts shall be smooth and even.

4.2.5 Springs, if used, in the construction of the flashlight shall be of necessary strength and durability and shall be corrosion-resistant.

4.2.6 The lamps shall conform to IS 2261 : 1975.

4.3 Workmanship

Workmanship of the flashlight and its component parts shall conform to good engineering practice.

5 FINISH

The finish of the flashlight shall be pleasing and durable. In case of flashlights with metallic bodies this may be achieved by anodizing, lacquering, chromium plating, painting or any other suitable process.

6 DIMENSIONS

The internal dimensions of the body of the flashlight shall be such as to properly accommodate the required number of dry batteries conforming to IS 203 : 1984.

7 MARKING

7.1 Each flashlight shall be marked with the following information:

a) Indicating the source of manufacture, and
b) Country of origin.

7.1.1 Any special marking may be added if required by the purchaser.

7.1.2 Each flashlight may also be marked with the Standard Mark.

8 TESTS

8.1 Type Tests

The type tests shall comprise the following:

a) Checking of dimensions, materials and construction (**4** and **6**);

b) Test for finish (**8.4**);
c) Drop test (**8.5**);
d) Climatic test (**8.6**);
e) Life test for switch (**8.7**);
f) Insulation resistance test (**8.8**); and
g) Light distribution test (**8.9**).

NOTE — The test for lumen output is proposed to be included when sufficient information is available.

8.1.1 *Samples for Type Tests*

A minimum number of five samples of the same type of flashlight shall be required for conducting the type tests. The distribution of the tests among these five samples shall be as following:

a) Checking of dimensions, materials and construction	All samples
b) Test for finish	1
c) Drop test	1
d) Climatic test	2
e) Life test for switch	1

NOTES

1 The other tests, such as insulation resistance, light distribution and contact resistance of the switch may be done on any of these samples.

2 An additional sample may be required in case the cold test is also to be conducted.

8.2 Acceptance Tests

The following shall comprise acceptance tests:

a) Checking of dimensions, materials and construction (4 and 6),
b) Functional test for switch (**8.7.1**),
c) Light distribution test (**8.9**), and
d) Insulation resistance test (**8.8**).

8.2.1 *Samples for Acceptance Tests*

In case of large consignments, a sampling procedure may be agreed to between the purchaser and the manufacturer. A recommended sampling procedure for flashlights is given in Annex C.

8.3 Routine Tests

The following shall comprise routine tests:

a) Checking of material and construction (**4**), and
b) Functional tests, for switch (**8.7.2**).

8.4 Test for Finish

8.4.1 The plating shall comply with service grade No. 1 of relevant specifications applicable as follows:

a) IS 1068 : 1985 (that is, S Ni 10b Cr r),
b) IS 4827 : 1983 (that is, C Ni 5b Cr r), and
c) IS 4828 : 1983 (that is, Z Ni 8b Cr r).

The break-up composition of Ni and Cr in service grade No. 1 is given as hereunder:

Base Material	*IS No.*	*Thickness in Microns* (Min)	
		Nickel	*Chromium*
Iron/Steel	1068 : 1985	10	0·3
Copper/ Brass	4827 : 1983	5	0·3
Zinc	4828 : 1983	8	0·3

8.4.1.1

a) Thickness of chromium plating to be determined by stripping method as per 6 of IS 3203 : 1983.
b) Thickness of nickel plating to be determined by BNF jet test method as per **5** of IS 3203 : 1983.

8.4.1.2

a) Plating on steel parts should withstand acetic acid salt spray test as per IS 6910 : 1985 for 8 hours.
b) Plating on copper and copper alloy parts should withstand salt spray test as per IS 6910 : 1985 for 16 hours.
c) Plating on zinc and zinc alloy parts should withstand acetic acid salt spray test as per IS 6910 : 1985 for 8 hours.

8.4.2 In the case of painted flashlights, the specimen shall be immersed in 5 percent salt solution at about 50°C for one hour. At the end of the period, the surface of the painted specimen shall not soften, peel off or produce blobs.

8.4.3 Unless otherwise agreed, anodized aluminium parts should be tested for continuity of anodized coating as per IS 8375 : 1977 and for sealing by marking test as per **5.2** of IS 5523 : 1983.

8.5 Drop Test

8.5.1 The flashlight, complete with battery (batteries), shall be held in a normal position of use. (In the case of tubular type of flashlights, the axis of the body shall be kept horizontal). It shall be dropped in this position from a height of 1 m on to a board made of seasoned *deodar* wood of following dimensions placed on a concrete floor:

Thickness	*Width*	*Length*
30 mm	250 mm (*Min*)	At least twice the length of the flashlight under test

8.5.1.1 There shall be no severe deformation, split or crack in any part of the body or cover of the flashlight after a single drop. There shall also be no defect in the functioning of the flashlight.

NOTES

1 The height of the drop shall be measured as the distance from the lowest part of the flashlight to the upper surface of the wooden board.

2 Any damage to the bulb or front protecting sheet shall not be considered for rejection under this test.

8.6 Climatic Tests

8.6.1 *Dry Heat Test*

The flashlight shall be placed in a chmber maintained at 50°C ± 2°C for a period of 16 hours. At the end of this period, it shall be taken out and cooled to room temperature and the switch shall then be tested for operation in accordance with **8.7.1**. There shall also be no deterioration to the finish of the flashlight.

8.6.2 *Damp Heat (Accelerated) Test*

The flashlight shall be placed in a humidity chamber in which the temperature is 55 ± 2°C. The relative humidity at all times shall be not less than 95 percent. The flashlight shall be exposed to these conditions for 16 hours at the end of which the sources of heat and humidity shall be cut off and the chamber allowed to cool to room temperature, the air being circulated meanwhile. The flashlight shall be subjected to two such cycles of damp heat and the switch shall be tested for functioning as specified in **8.7.1**. The insulation resistance shall also be checked and there shall be no deterioration to the finish. The paint film shall show no sign of breakdown and the metal surface shall show no sign of corrosion.

8.6.3 *Dry Cold Test (Optional)*

If required for special purposes, the flashlight shall be placed for one hour in a cold chamber at – 40 ± 3°C. At the end of this period the specimen shall be checked for functioning of the switch and for insulation resistance.

8.7 Life Test for Switch

The flashlight shall be loaded with the appropriate battery (or batteries) and the switch operated through 25 000 cycles successively. Each cycle shall comprise a full operation of the switch including locking, if provided. The number of cycles per minute shall be 25 to 35. The battery (or batteries) and bulb shall be changed after every 10 000 cycles (or earlier, if necessary). At the end of the test, the switch shall continue to function.

8.7.1 *Functional Test for Switch (for Acceptance only)*

For the purposes of acceptance of samples, the test as given in **8.7** shall be carried out through 100 cycles only. The contact resistance then measured shall not exceed 20 milliohms.

8.7.2 *Functional Test for Switch (for Routine Test only)*

The test as given in **8.7** shall be carried out through only one cycle as a routine test.

8.8 Insulation Resistance Test

At a temperature of 27 ± 2°C and relative humidity of 65 ± 4 percent, with the dry cells removed and the switch in open circuit condition, the insulation resistance between the anode and cathode for the cells shall be measured with an insulation resistance tester of rated voltage 500 V (*see* also IS 2992 : 1980). The insulation resistance value shall be not less than 2 MΩ.

8.9 Light Distribution Test

Light from the loaded flashlight shall be projected on to a plane at a distance of 2 m from the source and held perpendicular to the central line of the optical axis. In the case of focusing type of flashlights, this shall be done after focusing. The bright spot produced on the plane shall not exceed 30 cm in diameter.

NOTE — The use of an open box of not less than 60 cm × 60 cm × 60 cm with a circle having a black border and diameter 30 cm placed at the centre of one side with a white background is recommended to carry out this test.

8.10 Test for Contact Resistance of the Switch

The contact resistance of the switch shall be measured with a current of 300 mA flowing through switch contacts and source voltage being not greater than 3 V. The resistance shall not exceed 20 milliohms when the flashlight is new and 30 milliohms after 10 000 operations of the switch.

ANNEX A

(*Foreword*)

GUIDELINES FOR THE CHARACTERISTICS OF PORTABLE FLASHLIGHTS

A-1 The flashlight shall be a composite unit with a separate charger included. A suitable cradel shall be made available as an accessory for hands free operation.

A-2 BATTERY

A-2.1 Suitable rechargeable battery depending upon its application, shall be weather resistant provided with a charging socket on top of it.

A-3 LAMPS

A-3.1 The lamps shall conform to IS 2261 : 1975.

A-4 CHARGER

A-4.1 A suitable domestic charger with input 230 V ac with prefeiably solid state circuitory and automatic monitoring of the current may be provided. The dc leads of the charger are plugged into the socket of the lamp for recharging.

ANNEX B

(*Clause* 2.1)

LIST OF REFERRED INDIAN STANDARDS

IS No.	*Title*
203 : 1984	Dry batteries for flashlights (*fourth revision*)
1065 : 1971	Bleaching powder, stable (*first revision*)
1068 : 1985	Electroplated coatings of nickle plus chromium and copper plus nickel plus chromium on iron and steel (*second revision*)
1868 : 1982	Anodic coating on aluminium and its alloys (*second revision*)
2083 : 1978	Flashlights (*first revised*)
2261 : 1975	Lamps for flashlights (*first revision*)
2992 : 1987	Insulation resistance testers (magneto generator type) (*second revision*)
3203 : 1982	Methods of testing local thickness of electroplated coatings (*first revision*)
4827 : 1983	Electroplating coatings of nickel and chromium on copper and copper alloys (*first revision*)
4828 : 1983	Electroplated coatings of copper, nickel and chromium on zinc and zinc alloys (*first revision*)
4905 : 1968	Methods for random sampling
5523 : 1983	Methods of testing anodic coatings on aluminium and its alloys (*first revision*)
6910 : 1985	Method of testing corrosion resistance of electroplated and anodized aluminium coatings by acetic acid salt spray test (*first revision*)
8375 : 1977	Method for checking continuity of anodized coatings.

ANNEX C

(*Clause* 8.2.1)

SAMPLING PLAN AND CRITERIA FOR CONFORMITY FOR FLASHLIGHTS

C-1 LOT

C-1.1 All the flashlights of the same type and size manufactured by the same factory during the same period, using the same materials and process shall contitute a lot.

C-1.2 Samples shall be tested from each lot.

C-2 SCALE OF SAMPLING

C-2.1 The number of flashlights to be selected from each lot shall depend upon the lot size and shall be in accordance with col 1 and 2 of Table 1.

Table 1 Sample Size and Permissible Number of Defectives

(*Clause* C-2.1)

Lot Size (*N*)	Sample Size (*n*)	Permissible Number of Defectives (*a*)
(1)	(2)	(3)
Up to 100	13	1
101 to 300	20	2
301 to 500	32	3
501 to 1 000	50	5
1 001 and above	80	7

NOTES

1 Whenever the lot size is below 14 all the flashlights shall be tested and no defective flashlight shall be permissible.

2 The sampling plan is such that the lots with 4 percent or less defectives would be accepted most of the times.

C-2.2 Flashlights shall be selected at random. In order to ensure the randomness of selection, suitable procedures as given in IS 4905 : 1968 shall be adopted.

C-3 NUMBER OF TESTS AND CRITERIA FOR CONFORMITY

C-3.1 All the flashlights selected in the sample shall be subjected to the acceptance tests given in **8.2**. A flashlight shall be called a defective if it fails in any one of the acceptance tests. The lot shall be considered as conforming to the requirements of the acceptance tests, if the number of flashlight failing to satisfy in any one or more of the acceptance tests does not exceed the corresponding number of permissible defective (*see* col 3 Table 1).

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